APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/772,643	02/05/2004	Roger Keith Stager	ALA-PT012	5771

			EXAMINER
63983	7590	07/26/2006	SYED, FARHAN M

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ART UNIT	PAPER NUMBER
2165	

DATE MAILED: 07/26/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

	Application No.	Applicant(s)
Office Action Summary	10/772,643	STAGER ET AL.
	Examiner	Art Unit	
	Farhan M. Syed	2165	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>05 February 2004</u>.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-19</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-19</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>05 February 2004</u> is/are: a)☐ accepted or b)☒ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date <u>2004.0205</u>.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____ .

DETAILED ACTION

1.   Claims 1-19 are pending.

Drawings

2.   The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5)

because they include the following reference character(s) not mentioned in the

description: Figure 7, step 414. Corrected drawing sheets in compliance with 37 CFR

1.121(d), or amendment to the specification to add the reference character(s) in the

description in compliance with 37 CFR 1.121(b) are required in reply to the Office action

to avoid abandonment of the application. Any amended replacement drawing sheet

should include all of the figures appearing on the immediate prior version of the sheet,

even if only one figure is being amended. Each drawing sheet submitted after the filing

date of an application must be labeled in the top margin as either "Replacement Sheet"

or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the

examiner, the applicant will be notified and informed of any required corrective action in

the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

3.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly
> claiming the subject matter which the applicant regards as his invention.

4.   Claims 5 and 9 are rejected under 35 U.S.C. 112, second paragraph, as being

indefinite for failing to particularly point out and distinctly claim the subject matter which

applicant regards as the invention.

5.   Claim 5 recites the limitation "the time" in line 2. There is insufficient antecedent

basis for this limitation in the claim.

6.   Claim 5 recites the limitation "the snapshot" in line 2. There is insufficient

antecedent basis for this limitation in the claim.

7.   Claim 9 recites the limitation "the amount of mapping structures" in line 2. There

is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 101

8.   35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of
> matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the
> conditions and requirements of this title.

Claims 1 and 10 are rejected under 35 U.S.C. 101 because the disclosed

invention is inoperative and therefore lacks utility.

As per claim 1, it is not clear to the Examiner how duplication of writes occur

between primary and secondary volumes. In addition, the Examiner understands

identifying an APIT time window to be a mental step that does not produce a tangible

result, thus lacking utility.

As per claim 10, tracking writes, duplicating writes in sequential fashion,

organizing the mappings of writes, and identifying a time window are all mental steps

that a person may perform and does not produce a tangible result, thus lacking utility.

Claim Rejections - 35 USC § 102

9.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

10.   Claims 1-19 are rejected under 35 U.S.C. 102(e) as being anticipated by Kedem

(U.S. Patent 6,725,331).

        As per claims 1, 10, 14, Kedem teaches a system for providing continuous data

protection (i.e. *"As discussed above, there are other types of dynamic resource assignments that the*

storage system may employ in addition to dynamically assigning some targets as hot spares. Another

example involves a feature provided in the SYMMETRIX line of disk arrays known as "dual copy" or

"business continuance volumes" ("DC/BCVs")." The preceding text clearly indicates that continuous data

protection is the business continuance volumes.)(Column 5, lines 66-67; column 6, lines 1-4), the

system comprising: a host computer (i.e. *"Typically, data in a mass data storage system is*

accessed from a host computer in units called "logical volumes," with the host computer writing or reading

data to the storage system using a logical volume address or "logical device volume number" (hereafter

DV#).")(Column 1, lines 29-33); a primary volume for storing data written by the host

computer (i.e. *"Alternatively, it is possible in many systems to configure each physical storage device to*

store two or more logical volumes." "One example of this involves the dynamic assignment, during

operation, of one or more of the system's physical devices (e.g., a disk drive or a portion thereof) to store a particular logical volume." The preceding text clearly indicates that a primary volume is one logical volume that stores data, which stored on a physical storage device.)(Column 1, lines 35-37; lines 45-48); a secondary volume wherein writes made to the primary volume are sequentially duplicated onto the secondary volume (i.e. *"As discussed above, a statically configured DC/BCV logical volume (e.g., DV2) may be dynamically assigned as a DC/BCV copy of another logical volume in the system (e.g., DV0 or DV1). When a DC/BCV assignment is made, the volume of which a copy is made (e.g., DV0 or DV1) is referred to as the "primary" DC/BCV volume, and the DC/BCV volume (e.g., DV2) that makes the point-in-time copy is referred to as the "secondary" DC/BCV volume."* The preceding text clearly indicates that sequentially duplicated is a copy between the primary and secondary volume.)(Column 17, lines 51-58); and a data protection system configured to manage the duplication of writes to the secondary volume and map data between the primary and secondary volumes using delta maps wherein a time window is established wherein data structures are maintained so that within the established time window (i.e. *"As discussed above, a statically configured DC/BCV logical volume (e.g., DV2) may be dynamically assigned as a DC/BCV copy of another logical volume in the system (e.g., DV0 or DV1). When a DC/BCV assignment is made, the volume of which a copy is made (e.g., DV0 or DV1) is referred to as the "primary" DC/BCV volume, and the DC/BCV volume (e.g., DV2) that makes the point-in-time copy is referred to as the "secondary" DC/BCV volume. In the embodiment of the invention shown in FIGS. 9A-B, the entries in the GDAT/LDAT of table 500 differ for the primary and secondary DC/BCV volumes."*)(Column 18, lines 21-30), the primary volume may be restored to any point in time (i.e. *"After the copy is made, the storage system may de-establish the connection to create a snapshot of the contents of the copied logical volume at a particular point in time. The snapshot copy can then be used to perform various operations (e.g., making a backup of the data or generating a report based on its contents) without disrupting or holding up access to the logical volume that was copied. When the desired*

operations have been completed, the logical connection between the DC/BCV logical volume and the

copied logical volume may be reestablished, so that the DC/BCV volume can be updated with all changes

that occurred to the copied volume while the logical connection had been de-established. In this manner,

the DC/BCV volume can be used to provide a copy of the logical volume at a later point in time.")(Column

6, lines 11-25).

As per claims 2 and 16, Kedem teaches a system wherein the point-in-time map

is created by creating a full mapping between the primary and secondary volumes (i.e.

"For example, to protect critical data from equipment malfunction or other events that could result in a loss

of data, many data storage systems are configured to store multiple mirrors of the same logical volume on

two or more disk adapter targets, most typically on different disk drives." "After the copy is made, the

storage system may de-establish the connection to create a snapshot of the contents of the copied logical

*volume at a particular point in time.")(Column 5, lines 5-9; column 6, lines 11-14).

As per claim 3, Kedem teaches a method further including the steps of retaining

particular points in time beyond the APIT window (i.e. *"Alternatively, once the need for the point-*

in-time copy of the logical volume ceases, the DC/BCV volume can be dynamically assigned to another

logical volume, or can be kept idle and available for use to make a point-in-time copy of another logical

*volume.")(Column 6, lines 25-29).

As per claim 4, Kedem teaches a method wherein a point-in-time map is created

by creating a full mapping between the primary and secondary volumes for a point that

is retained beyond the APIT window (i.e. *"For example, to protect critical data from equipment*

malfunction or other events that could result in a loss of data, many data storage systems are configured

to store multiple mirrors of the same logical volume on two or more disk adapter targets, most typically on

different disk drives." "After the copy is made, the storage system may de-establish the connection to

create a snapshot of the contents of the copied logical volume at a particular point in time." "Alternatively,

once the need for the point-in-time copy of the logical volume ceases, the DC/BCV volume can be

dynamically assigned to another logical volume, or can be kept idle and available for use to make a point-

in-time copy of another logical volume.")(Column 5, lines 5-9; column 6, lines 11-14, lines 25-29).

As per claims 5, 12, and 17, Kedem teaches a method wherein the full mapping

is created by merging mapping data structures ranging in time from time zero to the

time the snapshot was taken (i.e. *"For example, to protect critical data from equipment malfunction*

or other events that could result in a loss of data, many data storage systems are configured to store

multiple mirrors of the same logical volume on two or more disk adapter targets, most typically on different

disk drives." "After the copy is made, the storage system may de-establish the connection to create a

snapshot of the contents of the copied logical volume at a particular point in time.")(Column 5, lines 5-9;

column 6, lines 11-14).

As per claims 6, 13, and 18, Kedem teaches a method wherein the full mapping

is created by merging mapping data structures ranging in time from the time a point-in-

time map created prior to the snapshot was taken to the time the snapshot was taken

(i.e. *"For example, to protect critical data from equipment malfunction or other events that could result in a*

loss of data, many data storage systems are configured to store multiple mirrors of the same logical

volume on two or more disk adapter targets, most typically on different disk drives." "After the copy is

made, the storage system may de-establish the connection to create a snapshot of the contents of the

copied logical volume at a particular point in time.")(Column 5, lines 5-9; column 6, lines 11-14).

As per claim 7, Kedem teaches a method wherein data on the secondary volume that is outside of the identified time window is discarded (i.e. *"Finally, a "not active mirror mask" field identifies which mirrors of the secondary volume (e.g., DV2) are not established as mirrors of the primary volume (e.g., DV1) when a DC/BCV connection is established. This entry "masks out" all mirrors of the secondary logical volume except for the one identified in the secondary mirror number entry. These "masked out" mirrors are deactivated while the DC/BCV connection is established, and are reactivated when the DC/BCV connection is de-established.")*(Column 18, lines 49-57).

As per claim 8, Kedem teaches a method wherein data on the secondary volume that is outside of the identified time window is phased out according to a retention policy (i.e. *"Finally, a "not active mirror mask" field identifies which mirrors of the secondary volume (e.g., DV2) are not established as mirrors of the primary volume (e.g., DV1) when a DC/BCV connection is established. This entry "masks out" all mirrors of the secondary logical volume except for the one identified in the secondary mirror number entry. These "masked out" mirrors are deactivated while the DC/BCV connection is established, and are reactivated when the DC/BCV connection is de-established.")*(Column 18, lines 49-57).

As per claim 9, Kedem teaches a method further comprising the step of periodically creating point-in-time maps to reduce the amount of mapping structures that are needed when performing a restore (i.e. *"For example, to protect critical data from equipment malfunction or other events that could result in a loss of data, many data storage systems are configured to store multiple mirrors of the same logical volume on two or more disk adapter targets, most typically on different disk drives." "After the copy is made, the storage system may de-establish the connection to create a snapshot of the contents of the copied logical volume at a particular point in time." "Alternatively, once the need for the point-in-time copy of the logical volume ceases, the DC/BCV volume can be*

dynamically assigned to another logical volume, or can be kept idle and available for use to make a point-in-time copy of another logical volume.")(Column 5, lines 5-9; column 6, lines 11-14, lines 25-29).

As per claim 11, Kedem teaches a method wherein a snapshot is taken at a particular point in time within the identified time window (i.e. *"For example, to protect critical data from equipment malfunction or other events that could result in a loss of data, many data storage systems are configured to store multiple mirrors of the same logical volume on two or more disk adapter targets, most typically on different disk drives." "After the copy is made, the storage system may de-establish the connection to create a snapshot of the contents of the copied logical volume at a particular point in time." "Alternatively, once the need for the point-in-time copy of the logical volume ceases, the DC/BCV volume can be dynamically assigned to another logical volume, or can be kept idle and available for use to make a point-in-time copy of another logical volume.")*(Column 5, lines 5-9; column 6, lines 11-14, lines 25-29) **and a full mapping of the primary and secondary volumes for the particular point time is created** (i.e. *"For example, to protect critical data from equipment malfunction or other events that could result in a loss of data, many data storage systems are configured to store multiple mirrors of the same logical volume on two or more disk adapter targets, most typically on different disk drives." "After the copy is made, the storage system may de-establish the connection to create a snapshot of the contents of the copied logical volume at a particular point in time.")*(Column 5, lines 5-9; column 6, lines 11-14).

As per claim 19, Kedem teaches a system wherein the mapping data structure is a delta map (i.e. *"In the example shown in FIGS. 9A-B, the entries for the primary (DV1) and secondary (DV2) DC/BCV volumes include values in (bytes "4-5") that point to one another, indicating that a DC/BCV connection is established between them. Mirror M1 of logical volume DV2 is established as mirror M3 of logical volume DV1.")*(Column 18, lines 62-67).
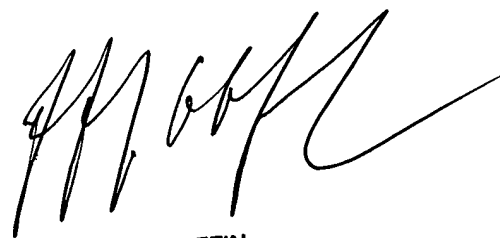
Contact Information

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Farhan M. Syed whose telephone number is 571-272-

7191. The examiner can normally be reached on 8:30AM-5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Jeffrey Gaffin can be reached on 571-272-4146. The fax phone number for

the organization where this application or proceeding is assigned is 571-273-8300.

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